Drainage Helps Rejuvenate Community Golf Course

For years, golf course superintendents started their careers operating a mower or hosing down greens in the afternoon heat. They were taught the way to do things by the superintendents they worked for on their way up.

In the past decade this has changed. Many golf course superintendents today skip much of the old apprenticeship by earning degrees in turf management or ornamental horticulture from Land Grant colleges and universities. It's not unusual for graduates of these programs to step right into an assistant superintendent's job at an 18-hole golf course.

Guy Auxer, superintendent of Heather Gardens Golf Course in Aurora, CO, took a different route on his way to becoming a superintendent. His suppliers and fellow superintendents think this could be the reason why he is more receptive to new products and ideas than those who came up the conventional way. This image was strengthened recently when he shunned conventional drainage methods to be the first golf course superintendent in the U.S. to try a new type of drainage system for his greens.

In his mid-30s, Auxer is a newcomer to the golf business. His first taste of success came during the building boom in Lubbock, TX, in the early 1970s. To pay his tuition for classes in architecture at Texas Tech, Auxer worked for an apartment building developer doing framing and trim. The demand for his services was so great he started his own framing company which specialized in custom homes. "I realized that I was making more money than I ever could as an architect," said Auxer, "so I stopped taking classes and devoted all my attention to my business."

In 1972, the building boom in Lubbock fizzled out and Auxer relocated to Denver where construction remained strong. He met a builder of custom homes there and quickly worked his way up to construction foreman. "I learned how to deal with wealthy people," says Auxer, "and how to provide them with what they wanted in a home. It was very detail-oriented work."

For six years, Auxer managed the construction of more than 20 custom homes per year. But at the age of 30, he learned that construction liens do not assure contractors will be paid. The company's cash flow could not keep the business alive and he was once again out of a good job.

Suddenly Auxer, a person used to dealing with thousands of details, found himself with nothing to do. To get out of the house and to keep his mind off his problems he played golf. Auxer watched with interest as the crews groomed the various courses he played.

He played golf so often he became close friends with the assistant golf professional at Meadow Hills Golf Course in Aurora, CO. "I guess I asked him so many questions about maintenance of the course he finally introduced me to the superintendent," Auxer jokes. "The next thing I knew was on the seasonal crew to find out first-hand what golf course maintenance was all about."

Soon thereafter Auxer joined the Rocky Mountain Golf Course Superintendents Association and met Jim McPhilomy, who was superintendent at Valley Country Club, in Englewood. "He took me under his wing and gave me a job as his assistant in training," Auxer said gratefully. McPhilomy recognized Auxer's construction experience and taught him all the fine points about pumps, controllers, sensors, design and drainage. The architect in Auxer quickly grasped the details.

Less than a year later, McPhilomy left to become an irrigation consultant and Tim Bullard, the assistant superintendent was promoted. Auxer, after a very short apprenticeship, was named assistant. "It was a great experience to work with Tim since we were both new to our positions," Auxer
Ither Gardens from other adult communities in states. "We installed a new pump station and automatic irrigation system. We did most of the work ourselves, including construction of a four acre lake. I realized then that this was a career I wanted to pursue as far as it could take me." To learn more, Auxer joined the Golf Course Superintendents Association of America (GCSAA) and enrolled in a two-year correspondence course in horticulture offered by the University of Guelph in Ontario, Canada. The course is the equivalent of a two-year degree with more than 45 credit hours and three supervised examinations. "It was the only program I could find where a working man can get an education in horticulture," Auxer reveals.

With a degree under his belt and a thirst for more responsibility, Auxer applied for the superintendent's position then open at Heather Gardens in Aurora. "During my first interview, Selby Myers, general manager of both the golf course and condominiums, asked a lot of questions about water. He was concerned about the large amount of water that the nine-hole course was using each year and the annoying number of wet and dry spots on the course. My tutelage under McPhilomy probably got me the job."

The golf course had been purchased in 1983 from the developer who built it and the surrounding 2,200-unit adult community in 1971. The Heather Gardens Association created a metropolitan district to gain the authority to tax residents for the purpose of retiring the bond issue used to purchase the golf course and a 42,000-square-foot community center. This required the association to make the golf course public. A board of directors for the district was elected by the condominium residents.

Recalling his days as a construction foreman, Auxer inspected the course thoroughly and wrote a 35-page proposal on the current conditions of the course and improvements needed. He told them the course had a serious thatch problem, a poorly maintained irrigation system and inadequate drainage in some areas. He explained why the course had required so much water for the turf and took so long to drain after rains and snows. At the same time he pointed out that these problems could be solved and that course revenue would increase as a result. The board gave Auxer the job, and, in two years the income of the course has nearly doubled. Reports have become a regular and major part of Auxer's job since.

The first day on the job in 1984, Auxer discovered that there were no organized files, just receipts from bills and payroll. He developed a filing system and started to write a daily log. He hopes to share a computer system soon with the superintendent in charge of the streets, parks and buildings so all records will be easily accessible.

At present, he keeps track of manhours according to a simplified version of a job identification system. Auxer is most concerned about seven categories: mowing, irrigation, aeration, equipment repair, sand traps, drainage and administration. His records show a shift in the percentage of total labor hours—away from mowing toward aeration, irrigation and drainage. Where once mowing represented 32 percent of total manhours, it now is only 15 percent. Labor for drainage leaped from less than one percent to nearly six percent. Aeration also jumped from four percent of the total to 13 percent while irrigation increased to 20 percent of labor hours from ten percent.

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The golf course crew consists of Auxer, assistant superintendent Todd Jeffers, one full-time laborer and six summer workers. When he needs more help he can get it from the Heather Gardens roads and grounds crew.

Auxer directed his attention immediately to the three biggest problems: drainage, irrigation and thatch.

Since the entire course is on a three to five percent slope and the greens are highly contoured, many spots were too dry while others were too wet. Auxer discovered three different types of soils on the course ranging from blow sand to spongy muck. These areas needed separate irrigation, drainage and maintenance programs.

The bentgrass greens had more than one inch of thatch, were spongy in low spots and hard as a rock in high spots. They had not been built according to USGA (United States Golf Association) specifications. Auxer found the soil on the greens to be 50 percent fine sand, 30 percent silt and clay and 20 percent organic matter. The soggy turf in the swales on the greens had to be aerified just to keep it alive. Golf balls chipped onto low spots got buried in the damp thatchy bentgrass while those landing on the high spots would bounce without holding at all. Auxer needed a solution to the problem without high cost or the need to close the course for days.

The installation process started by cutting a herringbone pattern in the bentgrass green with a sod cutter.

Aerifying the greens once a month with a Banks Multicore, removing the cores and topdressing with sand has reduced the thatch and softened the high spots to a degree. But, the low spots still did not drain well and the soil remained waterlogged. In another effort to increase the sand content of the greens, Auxer has his crew fill the old holes with pure sand when they move cups. The soil that is removed when the cup is cut is discarded.

This spring the Denver area was unseasonably warm and humid. The poorly-drained greens quickly succumbed to pythium. Auxer called in the Jefferson County turf extension agent who sent samples to Colorado State University (CSU) for analysis. Three different strains of pythium were found. Treatments with Subdue eliminated two out of the three strains. Auxer, encouraged by Dr. William Brown of CSU to alternate fungicides, is trying Aliette, which just received a turf label. But he still needs...
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ed to improve the drainage on the greens.

While attending the GCSAA Show in San Francisco, Auxer saw a new type of drainage device. Instead of a round tube with slits, this device was a strip of plastic indented like a waffle and wrapped in a geotextile fabric. The 1 1/2-inch-wide device came in various heights and fit easily into a two-inch-wide trench. He reasoned that he could install this narrow, upright drain system faster than conventional round PVC drain tubing and with less soil disturbance. This could solve his problem on the greens and help him save on labor and equipment costs. Unfortunately, there was no distributor for the company in the Denver area.

Greg Fast, salesman for Turf Irrigation Supply, was familiar with Auxer's problems on the course. He supplied both the golf course and the the condominiums with products.

When Turf Irrigation Supply became a distributor for Warren's Turf Nursery this spring, Fast, recalling Auxer's problems, along with Emory Hunter, manager of Warren's Seed and Special Products division, called on Auxer to show him a sample of a new drainage product. Hunter showed Auxer his company's new TerraFlow drainage system. It was the wrapped, waffle-like drain Auxer had seen at the show. Auxer didn't need any selling, he placed an order on the spot and started planning to install it in the green swales.

The geotextile fabric surrounding the waffle-like core provides ten times more effective drainage surface than four-inch perforated drain pipe.

Heather Gardens would be the first golf course to use the product on golf greens. The new drain system operates on the principle that the polyester, geotextile wrapper provides ten times more effective drainage area than the slits in four-inch perforated drainpipe. Once water passes through the non-woven fabric, it flows along the core with the slope. The fabric wrap filters out any soil particles large enough to clog the core.

On a Monday morning in early April, Auxer and his crew installed 450 feet of TerraFlow on the worst green in just four hours. First he moved the cup onto the approach so the hole could remain open during repair. The crew used a sod cutter to remove the bent-grass sod from the green in a herringbone pattern. The sod was fragile since it had been aerified twice that winter.

A small walk-behind trencher was rented to cut trenches 12 inches deep and two inches wide. Lateral trenches, eight feet apart and perpendicular to the slope, fed into a single mainline. A standard minimum slope of 1.5 percent is required for proper drainage. After the soil was hauled away, six-inch-high TerraFlow was inserted into both the laterals and mainline. In his first installation, Auxer ran the material in the mainline into a dry well away from the green.

No special fittings were needed. The material was overlapped and taped together with duct tape at joints.

The trenches were then backfilled with sand, and packed. The sod was laid over the sand-filled trenches, rolled, topdressed with more sand and watered. By noon the green was back in play.

The process was repeated on a second green the next morning. In this case, the material was connected with duct tape to older drain lines that had been cleaned out with a high pressure hose the week before.

"Within three weeks you couldn't even see where the sod had been cut," says Auxer. In fact, few golfers realized what he had done, they just knew the wet spots were gone. They'll find out in the next associa-
tion newsletter. "I think a superintendent has to let the members know how hard he is working for the course. Too many jobs aren't noticed. Many golfers think we just mow grass."

The test came four days later when a freak storm dumped two feet of heavy, wet snow on the course. The snow melted steadily over a four-day period. As the last traces of snow melted, a check of the green showed the swales to be firm and not soggy as before. "Since this is the first time the product has been used on a golf course green, we had to learn as we went," says Auxer. "On the next installation we are going to put the trenches on six-foot centers instead of eight-foot. The system seems to work best in this soil within three feet of either side of the drainlines."

Auxer called Fast and ordered enough material to do another green. The process was repeated in June with similar success. He is set to do two more greens this fall. "The best part about the TerraFlow is it can be installed faster and with less disturbance than drain pipe," boasts experimenter Auxer. "I figure it took one third the labor of installing four-inch perforated drainpipe."

More than 2,500 cubic yards of thatch was removed.

On the fairways Auxer faced a mottled combination of perennial ryegrass, Kentucky bluegrass, tall fescue, creeping red fescue, sheep's fescue and hard fescue with more than two inches of thatch in some areas. Besides the appearance, the thatch made the turf susceptible to the shortest dry spell, more prone to disease and too soft for good golf. Far too much water had to be applied to compensate for the effects of the heavy thatch layer. This only served to make the problem more severe.

With the typical budget of a nine-hole course, Auxer had a lot to do without a lot of money. Using a Dedoes drum aerifier pulled by a truckster, Auxer went over the fairways 12 times with half-inch tines spaced 3 1/2 inches apart. The inch-deep cores, which were mainly thatch, were picked up and hauled away. Within the first year the thatch layer was cut in half by aerifying, removing the cores, mowing more frequently and decreasing nitrogen fertilization. Auxer estimates that each time the fairways were aerified more than 2,500 cubic yards of thatch was removed.

The pH of the soil in the fairways was a healthy 6.5 to 6.9, but Auxer felt it lacked biological activity so he sprayed them with Bovamura, a composted soil amendment.

He also injects Naiad wetting agent into the irrigation system six times per year to make sure the water enters the soil instead of running off the sloped surface.

Auxer wants tight control of fertilization to prevent lush growth and thatch buildup. In the fall he makes one application of IB-DU (Par-Ex) for early spring green-up and then spoon feeds the turf the rest of the year with Nutriculture and straight urea.

"We spray a 50-foot-wide swath each pass with Broyhill boom jet nozzles attached to a Bean sprayer," explains Auxer. "It may increase our labor cost by ten percent, but we save more than half by buying individual components. We put down only what we need, which amounts to three to four pounds of nitrogen per year plus six pounds of sulfate of potash. Micronutrients are contained in the soluble Nutriculture, which we apply as needed."

Auxer has prepared and submitted a proposal to renovate the fairways. "The fairways were overseeded with perennial ryegrass four years ago," he explains. "The seed must have been broadcast onto the bluegrass and not drilled in as it should have been. The resulting ryegrass is in patches which stand out and provide an irregular surface for golfers. Annual bluegrass is also a problem on the fairways."

"I told the management there are two ways we can go," says Auxer. The fastest and continued on page 30
least expensive route is to use glyphosate (Roundup) to kill all the fairway turf and reseed with a blend of Kentucky bluegrasses. The other is a three-year program utilizing growth regulators when they become available to slowly eliminate the annual bluegrass. All costs were spelled out in the report so there would be no surprises. Based upon this report, the board can make the decision this fall when they approve the 1987 budget."

With so much attention required to get the greens and fairways back in shape, Auxer has not been able to devote the amount of time he would like to the tees. With the exception of two tees, he has been able to keep the turf healthy through aerification, better fertilization and careful irrigation. He recently enlarged the two problem tees to distribute the wear.

Irrigation

Auxer's major concern, and the one that got him hired in the first place, was the irrigation system. In his original proposal to the board he pointed out major adjustments needed for the pumping system, the controllers and head locations.

In his opinion, the general layout and selection of heads and valves was good. "The main reason the system was in poor condition when I arrived was due primarily to lack of periodic maintenance," Auxer points out. "Sprinkler heads are designed to run for three to five years with just occasional flushing and surface cleaning. After this length of time they should be removed and repaired by replacing all washers and worn or broken parts. The return spring arms need to be adjusted to manufacturer's recommendations. When you have 450 heads on a nine-hole golf course, it's a big job to keep them all working properly."

More than half the heads were incorrectly set either below grade or not level. Many were spaced wrong which contributed to poor coverage and caused wet and dry spots on greens, tees and fairways. By relocating and adjusting the heads many of these problems were solved.

When his crew started the repair work they discovered the heads were originally installed with galvanized steel swing joints. The idea of a swing joint is to let the head sink when stepped on or run over with a cart. These joints are now rusted solid and will not move. If they do move, they start to leak and cause wet spots. Auxer has replaced more than 100 of the steel swing joints with plastic.

The pumping station presented a more complex puzzle: it had been installed with insufficient controls and without a surge tank. As a result, the system was not constantly pressurized. Pin hole leaks in the main lines and leaking valves went undetected. When the pumps went on the chance of surge or water hammer damage was great.

Auxer's proposal to add a surge tank was accepted and one was installed in 1985. Once the system was pressurized, the crew was able to locate the leaks and make necessary repairs. Auxer also discovered 26 valves which needed to be rebuilt or replaced out of the 156 on the course.

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Some day I'd like to tie these into one central irrigation computer."

A Naiad injection system was installed to add wetting agent to the irrigation system. Auxer credits the wetting agent, renovation of the irrigation system and thatch reduction for big savings in water. Even though rainfall in Aurora in 1985 was two inches less than 1984 and the temperatures averaged two degrees higher, the golf course saved 40 percent on water. The golf course's main water source is a well, even though a major raw water pipeline crosses underneath the course. Auxer predicts this well will run dry within 15 years. Another possible source of water in the future is secondary effluent from the city or a water treatment facility that has been mentioned to the association board.

Fast from Turf Irrigation Supply points out, "The Denver area is on a continuous water rationing program. Some suburbs only allow homeowners to irrigate every third day. Golf course superintendents have to be very sensitive to water use."

Heather Gardens has two acres of lakes. These required regular treatment with copper sulphate to prevent algae blooms. This bothered Auxer because the grandchildren of the residents often play near the lakes and watch the ducks that make the lakes their home. Being the experimenter he is, he wanted to replace chemicals with weed-eating white amurs, a member of the carp family.
family. "We stocked the lake with amurs last fall and so far this summer have no trace of algae," says Auxer. "I'd like to install aerator fountains to oxygenate the water and provide another feature to the lakes."

Trees are another feature Auxer wants to increase on the course. A look at the original plans showed him that only 250 out of 1,200 trees on the plan had ever been planted. The cost of 800 specimen trees for the course was out of the question. He heard that the state provides seedlings for windbreaks at very low cost. For $325, he obtained 825 seedlings, including spruce, pines, ash, locust and Russian olive. These were planted on the perimeter of the course as a windbreak. "We may move them to other locations as they mature," Auxer revealed. In the meantime, $5,000 had to be spent to replace trees that died last year with larger trees. Auxer hopes that within five years the course will appear as the architect had planned.

In a recent survey, the residents said the golf course is the central amenity that distinguishes Heather Gardens from other condominium communities.

Auxer approached the planting of flowers on the course in the same creative way. Faced with limited labor, he wanted to reduce the amount of maintenance required by flower beds without losing the color. He decided to plant perennial flowers instead of annuals and has since replaced all annuals with perennials. "They cost the same or less than annuals, and don't require purchasing and replanting every year," he states.

A landscape architect helped Auxer select a mix of species that would bloom throughout the entire season. The beds are covered with shredded cedar bark mulch and fed with foliar fertilizers. Periodically, the dead flower heads are knocked off with weed eaters.

Auxer also discovered, while reviewing the old plans, that some sand traps were as much as six feet smaller than they were supposed to be. Over the last two years, his crew has rebuilt these bunkers to their proper dimensions. "We removed the sand, widened and reshaped the traps to fit the plan, installed new drainage and put in new, clean sand," outlines Auxer. The golfers noticed this change right away!

It may sound like Heather Garden's budget has increased substantially and it has. By justifying each improvement to the board he has increased the course's budget from $90,000 to $150,000. "It may be the largest budget for a nine-hole course in the state," says Auxer. In the first five months of this year, rounds played have doubled. At this rate, the course will exceed 45,000 rounds for the first time.

"Eighty percent of the rounds are played by residents of Heather Gardens," points out general manager Myers. "In a recent survey, the residents said the golf course is the central amenity that distinguishes Heather Gardens from other condominium communities. Also, non-golfers are as concerned with the condition of the course as golfers since their condominiums overlook it. There is no question that the golf course makes this a more desirable place to live."

"There is no reason why nine-hole courses can't compete with bigger courses if they take course maintenance seriously," Auxer believes. "You have to watch expenditures closely and keep track of labor. It's when you let maintenance and repairs get backed up that you face problems. Keep on top of things and be frugal, and you can serve a large portion of the growing golf business."